DIESEL ENGINE

C190GB, C190KE, C190, C240 MODELS

WORKSHOP MANUAL

ISUZU MOTORS LIMITED

The following manuals in English language version are available for use in inspection, adjustments and repaire of Isuzu light-duty truck and bus series.

MANUALS AVAILABLE / UNIT OR EQUIPMENT APPLICABLE		WORKSHOP MANUALS	SERVICE MANUALS
ENGINE	: G161	G161-WE-741	
	: C190, C240	1924-WE-101	
	: 4BA1, 4BC1	4BAC-WE-001	
	: 4BD1	46BD-WE-011	
CLUTCH		LCLU-WE-001	
PROPELLER SHAFT		LPRO-WE-001	
TRANSMISSION		LTRM-WE-001	
REAR AXLE		LRAX-WE-001	
FRONT AXLE		LFAX-WE-001	
BRAKE		LBRK-WE-001	
STEERING		LSTR-WE-001	
SUSPENSION		LSUS-WE-001	
CHASSIS ELECTRICALS		LCEL-WE-001	
ENGINE ELECTRICALS		HLEE-WE-001	
INJECTION PUMP		—	INJ-SE-011

When design change is effected on some equipment for 1981 year model, the details of changes are outlined in the workshop manuals and those manuals are issued with the new publication number (○○○○-WE-011).

ISUZU

WORKSHOP MANUAL

DIESEL ENGINE

C190GB,C190KE,C190,C240 MODELS

FOREWORD

This manual includes special notes, important points, service data, precautions, etc. that are needed for the maintenance, adjustments, service, removal and installation of the components of the model titled.

All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of publication.

The right is reserved to make changes at any time without notice.

Arrangement of the material is shown by the table of contents on the right-hand side of this page. Black spot on the first page of each section can be seen on the edge of the book below section title. A more detailed table of contents precedes each section.

This manual applies to the 1981 year and later models.

SECTION INDEX

SECTION 1
GENERAL INFORMATION

INDEX

CONTENTS PAGE

GENERAL REPAIR INSTRUCTIONS

1. For assurance of safety, park the vehicle on level ground and brace the front or rear wheels when lifting the vehicle.
2. Raise the vehicle with a jack set against the axle or frame and perform service operation after supporting the vehicle on chassis stands.
3. Before performing service operation, disconnect grounding cable from the battery to reduce the chance of cable damage and burning due to short-circuiting.
4. Use a cover on body, seats and floor to protect them against damage and contamination.
5. Brake fluid and anti-freeze solution must be handled with reasonable care as they can cause paint damage.
6. The use of proper tools and special tools where specified, is important to efficient and reliable service operation.
7. Use genuine Isuzu parts.
8. Used cotter pins, gaskets, O-rings, oil seals, lock washers and self lock nuts should be discarded and new ones should be prepared for installation as normal function of the parts can not be maintained if these parts are reused.
9. To facilitate proper and smooth reassembly operation, keep disassembled parts neatly in groups.
   Keeping fixing bolts and nuts separate is very important as they vary in hardness and design depending on position of installation.

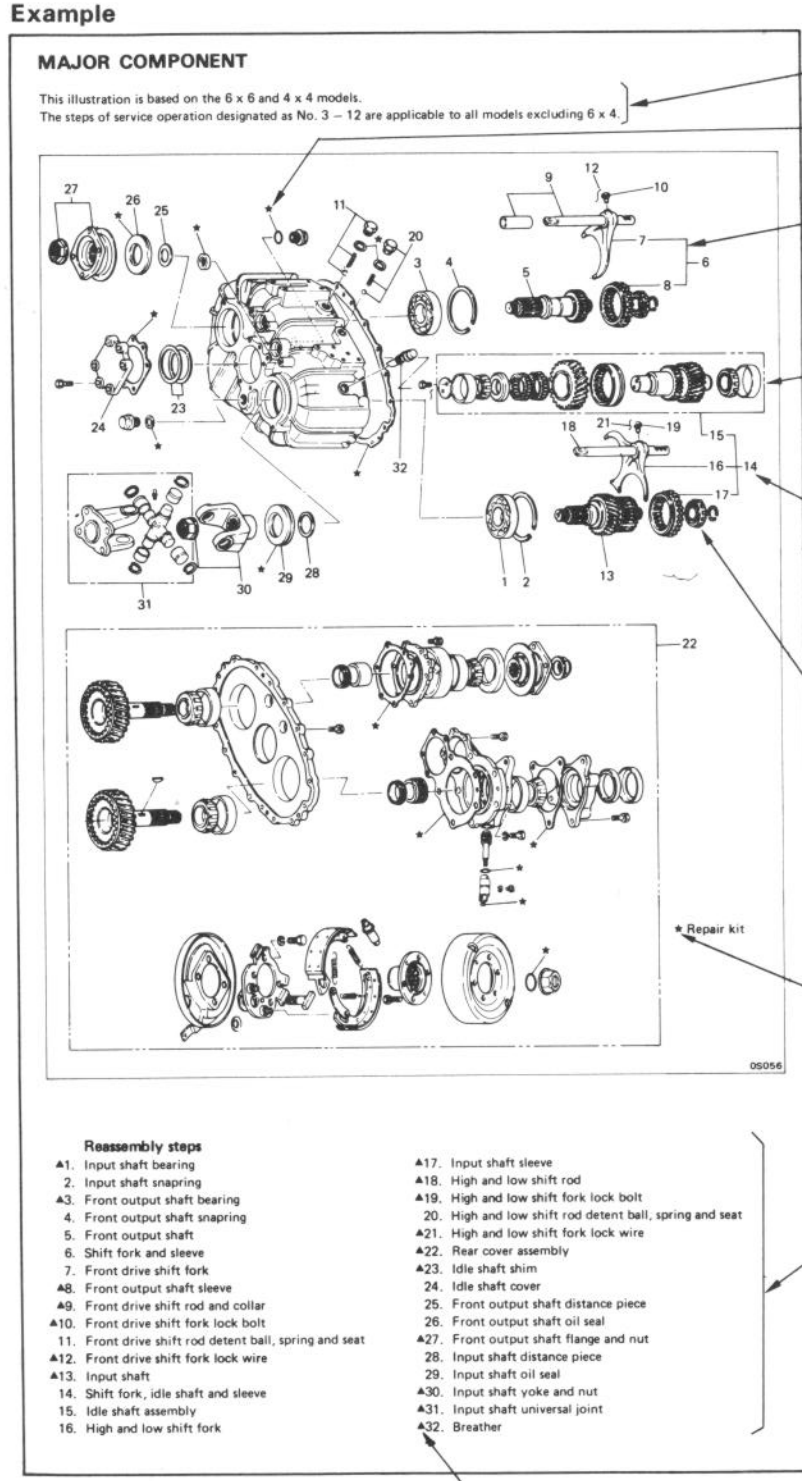
10. Clean the parts before inspection or reassembly. Also clean oil ports, etc. using compressed air to make certain they are free from restrictions.
11. Lubricate rotating and sliding faces of the parts with oil or grease before installation.
12. When necessary, use a sealer on gaskets to prevent leakage.
13. Carefully observe all specifications for bolt and nut torques.
14. When service operation is completed, make a final check to be sure service has been done properly.
15. For assurance of safety, always release air pressure solely from the air tanks before disconnecting pipes, hoses or other parts from any unit under air pressure.

HOW TO USE THIS MANUAL

1. Find the applicable section by referring to the index.
2. This manual includes "General information" section in which service data, maintenance items and specifications with torques are included.
3. Each section includes removal and installation, disassembly, inspection and repair and reassembly. When the same service operation applies to more than one units or equipments, notice is inserted stating, "Refer to manual for other units or equipments".
4. In removal and installation section, description of self-explanatory items such as removal of individual parts from unit to be removed, is omitted and important operation such as adjustments, torque specifications, etc. are dealt with mainly.

5. Each service operation section begins with disassembled view of unit or equipment which is useful to find components, service procedure, availability and content of repair kits, etc.

Example



Reassembly steps

▲1. Input shaft bearing
2. Input shaft snapring
▲3. Front output shaft bearing
4. Front output shaft snapring
5. Front output shaft
6. Shift fork and sleeve
7. Front drive shift fork
▲8. Front output shaft sleeve
▲9. Front drive shift rod and collar
▲10. Front drive shift fork lock bolt
11. Front drive shift rod detent ball, spring and seat
▲12. Front drive shift fork lock wire
▲13. Input shaft
14. Shift fork, idle shaft and sleeve
15. Idle shaft assembly
16. High and low shift fork
▲17. Input shaft sleeve
▲18. High and low shift rod
▲19. High and low shift fork lock bolt
20. High and low shift rod detent ball, spring and seat
▲21. High and low shift fork lock wire
▲22. Rear cover assembly
▲23. Idle shaft shim
24. Idle shaft cover
25. Front output shaft distance piece
26. Front output shaft oil seal
▲27. Front output shaft flange and nut
28. Input shaft distance piece
29. Input shaft oil seal
▲30. Input shaft yoke and nut
▲31. Input shaft universal joint
▲32. Breather

"Note" indicating models applicable.

★ parts contained in repair kit.

Parts to be removed or installed as a unit.

All units or parts within frame are to be considered as "major component". Each unit or part within frame is to be considered as "minor component".

The number represents sequence of service operation.

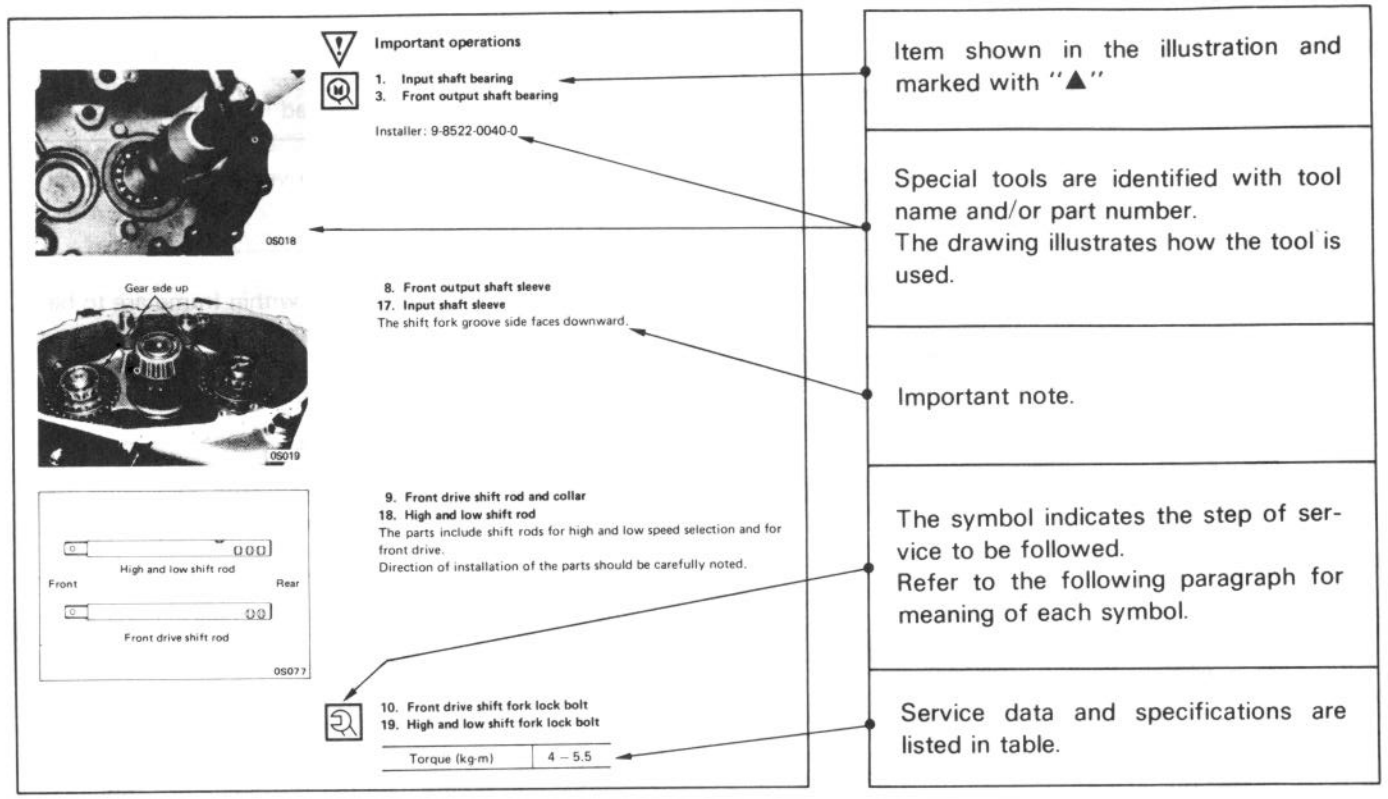
Removal of the parts without number (excluding bolts, nuts, washers, gaskets, cotter pins, etc.) is unnecessary unless when replacement is needed.
Where parts replacement requires specific note, instructions are given in "Inspection and repair".

★ indicates repair kit availability.

Name of parts listed in sequence of service operation.

▲ indicates important operation.
Details of service operation are described in the paragraph "Important operations"

6. The section following illustration(s) deals with important service steps marked with "▲".
   This section also includes "notes", "use of special tools", "service data", etc.



7. In this manual, the following symbols are used to indicate the type of service operations to be performed.

.... Remove		.... Adjustment	
.... Install		.... Clean	
.... Disassemble		.... Pay close attention — important	
.... Reassemble		.... Tighten to specified torque	
.... Align the marks		.... Use special tool(s) (Isuzu's tool(s))	
.... Correct direction		.... Use special tool(s) (parts manufacturer's tool(s))	
.... Inspect		.... Lubricate with oil	
.... Take measurement		.... Lubricate with grease	

8. The service standard is indicated in terms of "Standard" and "Limit".
   The "standard" means the assembly standard and standard range within which the parts are considered serviceable.
   "Limit" indicates the limit value (Correction or replacement is necessary when measurement is beyond this limit.)

9. In this manual, the components and parts are printed in singular form.

APPLICATION CHART

C190GB, C190KE ..... Engine with VE type injection pump and belt type timing drive train
C190, C240 ..... Engine with in-line type injection pump and gear type timing drive train

○ Applicable model

Vehicle models \ Engine models		C190GB	C190KE	C190	C240
Passenger car	PAD	○			
Light-duty trucks	*KBD		○		
	KBD			○	
	KAD			○	
	TLD				○

Model with * mark ..... For special territories.

MAIN DATA AND SPECIFICATIONS

Items \ Engine model	C190GB C190KE	C190	C240
Engine type	Water-cooled, 4-cycle in-line, overhead valve type		
Combustion chamber type	Swirl chamber type		
Cylinder liner type	Dry type, Cromard liner		
Timing gear system	Belt drive	Gear drive	
No. of piston ring	Compression ring 2, oil ring 1		
No. of cylinder - bore x stroke (mm)	4 - 86 x 84		4 - 86 x 102
Total piston displacement (cc)	1,951		2,369
Compression ratio	20 : 1		
Engine dimensions : length x width x height (mm)	Approx. GB730x570x625 KE696x666x715	Approx. 682 x 600 x 633	Approx. 685 x 606 x 685
Engine weight (dry) (kg)	Approx. 220	Approx. 221	Approx. 223
Fuel injection order	1-3-4-2		
Fuel injection timing (B.T.D.C. static)	15°	18°	14°
Type of fuel used	High-speed diesel fuel (SAE No. 2)		
Fuel filter type	Cartridge type		
Injection pump type	Bosch distributor VE type	Bosch in-line A type with automatic timer	
Governor type	Mechanical variable speed (half all speed)	Pneumatic and mechanical variable speed	
Injection nozzle type	Throttle type		
Fuel injection pressure (kg/cm^2)	105	120	
Compression pressure (kg/cm^2)	31 (at 200 rpm)		
Idle speed (rpm)	GB 600 — 650 KE 675 — 725	675 — 725	
Intake and exhaust valve clearance (cold) (mm)	0.45		
Intake valve open at	11° (B.T.D.C.)		
close at	49° (A.B.D.C.)		
Exhaust valve open at	51° (B.B.D.C.)		
close at	9° (A.T.D.C.)		
Lubrication method	Pressurized circulation		
Oil pump type	Gear type (4 x 4) Rotor type (4 x 2)	Rotor type	
Oil filter type	Paper element, full-flow type		
	Cartridge type	Cartridge type or paper element type	
Piston cooling	With oiling jets		
Lubricating oil capacity (liters)	GB 6.0, KE 6.5	6.5	
Oil cooler type	Water-cooled		
Cooling method	Pressurized circulation		
Cooling water capacity (liters)	9.0		
Water pump type	Impeller type		
Thermostat type	Wax pellet type (with jiggle valve)		
Air cleaner type	Cyclone type combined with paper element type		
Battery type — Voltage (V) x No. of unit	NS70/NX120-7 — 12 x 1		N100 — 12 x 1
Generator Voltage — capacity (V—A)	12 — 50/65/80	12 — 40	
Starter Voltage — output (V—KW)	12 — 1.8/2.2	12 — 1.8	12 — 2.2

TORQUE SPECIFICATIONS

STANDARD BOLTS

The torque values given in the following table should be applied where a particular torque is not specified.

(kg-m)

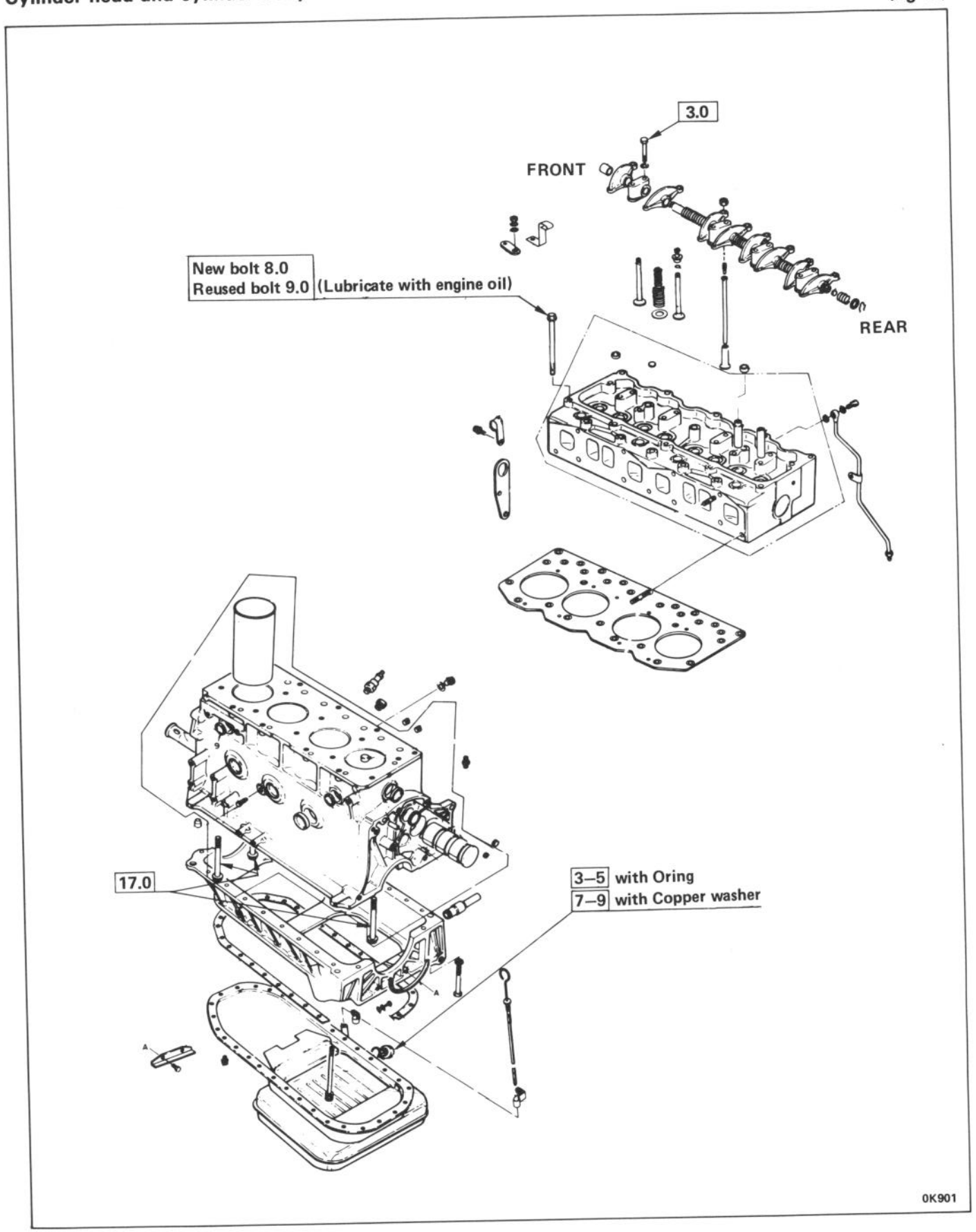
Bolt identification / Bolt diameter x pitch (mm)	4	7	9
	4 T (Low carbon steel)	7 T (High carbon steel)	9 T (Alloy steel)
6 x 1.0	0.4 — 0.8	0.5 — 1.0	—
8 x 1.25	0.8 — 1.8	1.2 — 2.3	1.7 — 3.1
10 x 1.25	2.1 — 3.5	2.8 — 4.7	3.8 — 6.4
*10 x 1.5	2.0 — 3.4	2.8 — 4.6	3.7 — 6.1
12 x 1.25	5.0 — 7.5	6.2 — 9.3	7.7 — 11.6
*12 x 1.75	4.6 — 7.0	5.8 — 8.6	7.3 — 10.9
14 x 1.5	7.8 — 11.7	9.5 — 14.2	11.6 — 17.4
*14 x 2.0	7.3 — 10.9	9.0 — 13.4	10.9 — 16.3
16 x 1.5	10.6 — 16.0	13.8 — 20.8	16.3 — 24.5
*16 x 2.0	10.2 — 15.2	13.2 — 19.8	15.6 — 23.4
18 x 1.5	15.4 — 23.0	19.9 — 29.9	23.4 — 35.2
20 x 1.5	21.0 — 31.6	27.5 — 41.3	32.3 — 48.5
22 x 1.5	25.6 — 42.2	37.0 — 55.5	43.3 — 64.9
24 x 2.0	36.6 — 55.0	43.9 — 72.5	56.5 — 84.7

The asterisk * indicates that the bolts are used for female-threaded parts that are made of soft materials such as casting, etc.

MAJOR PARTS FIXING BOLTS

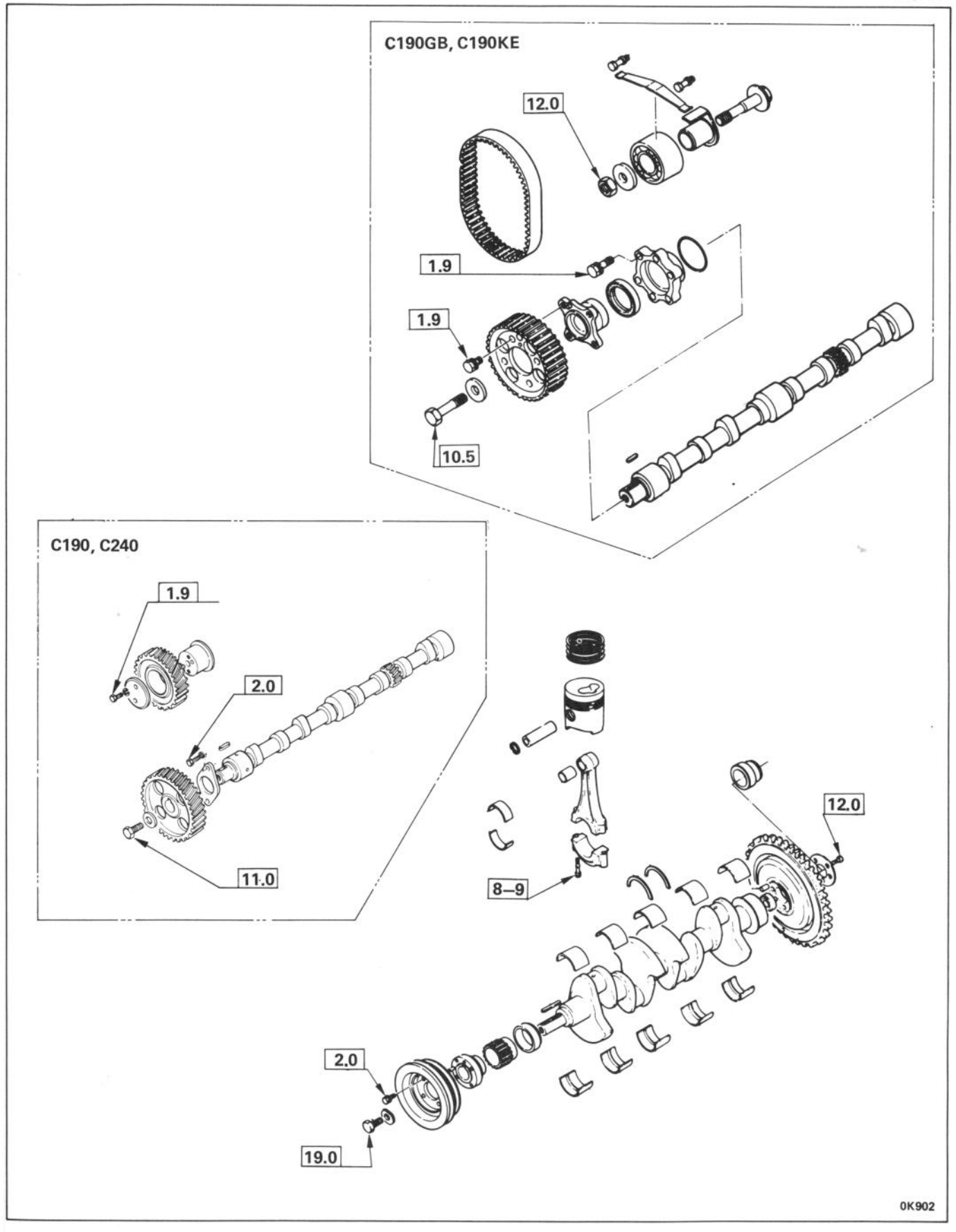
Cylinder head and cylinder body

(kg-m)



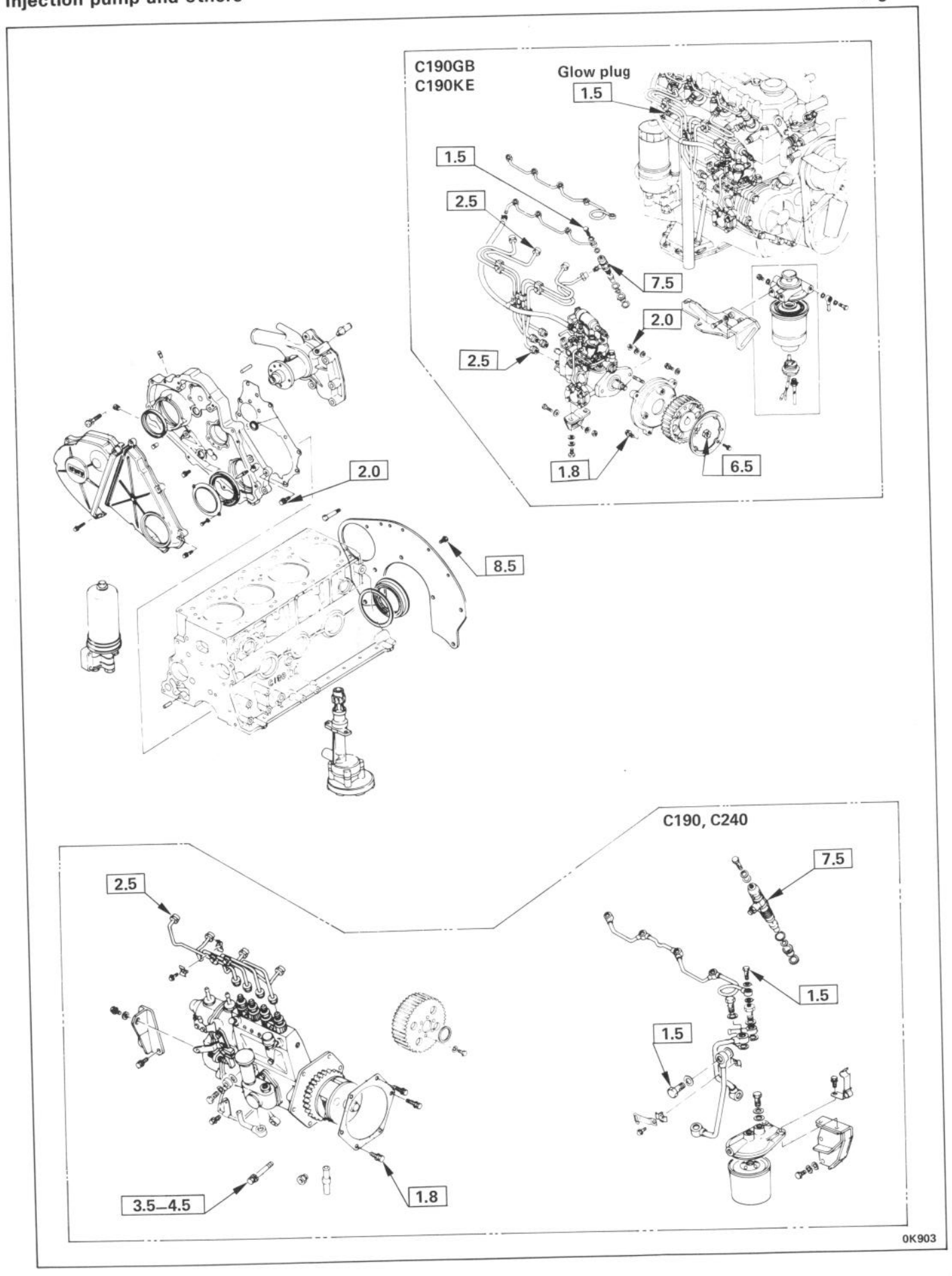
Crankshaft and camshaft

(kg-m)



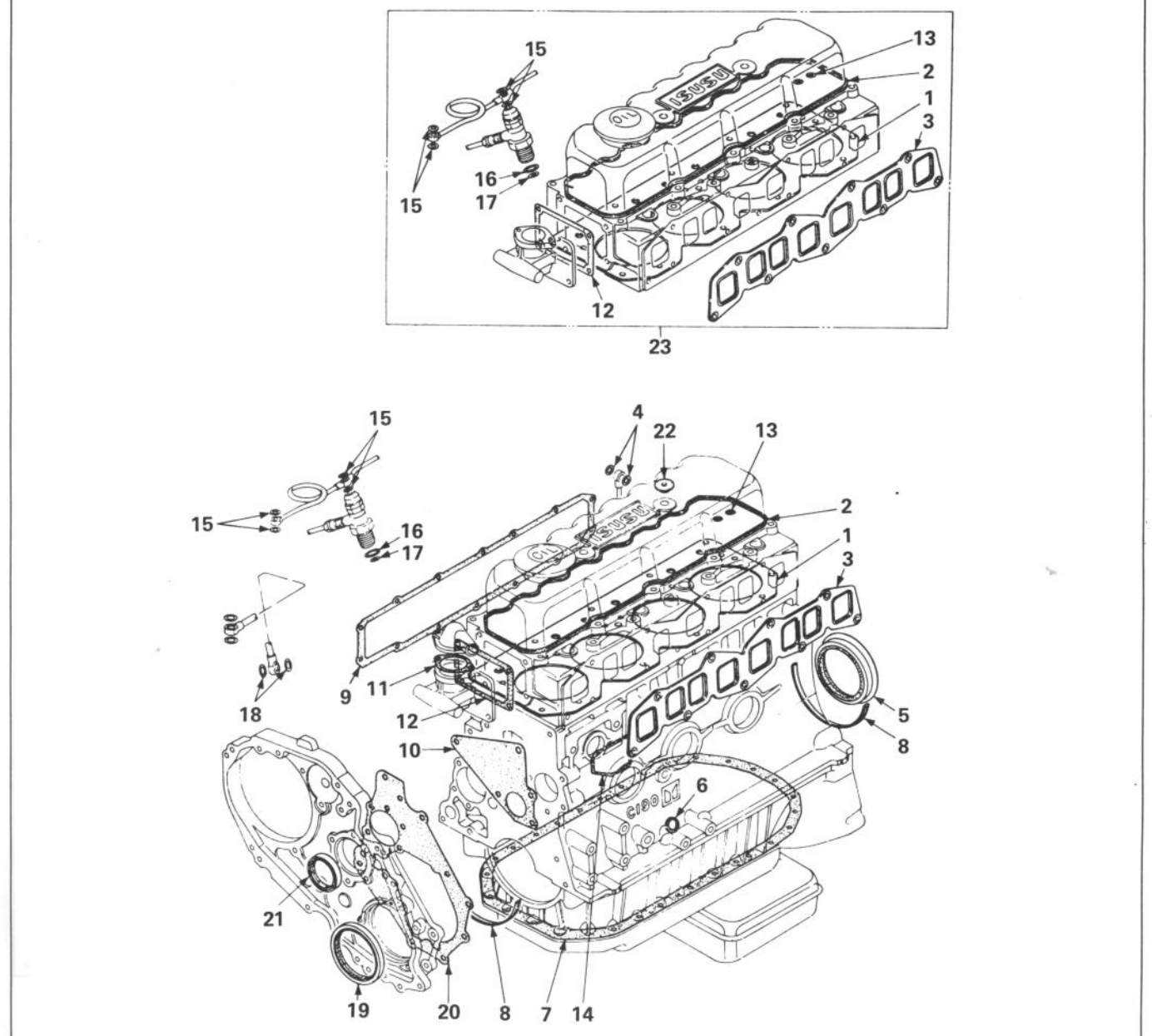
Injection pump and others

(kg-m)



ENGINE REPAIR KIT

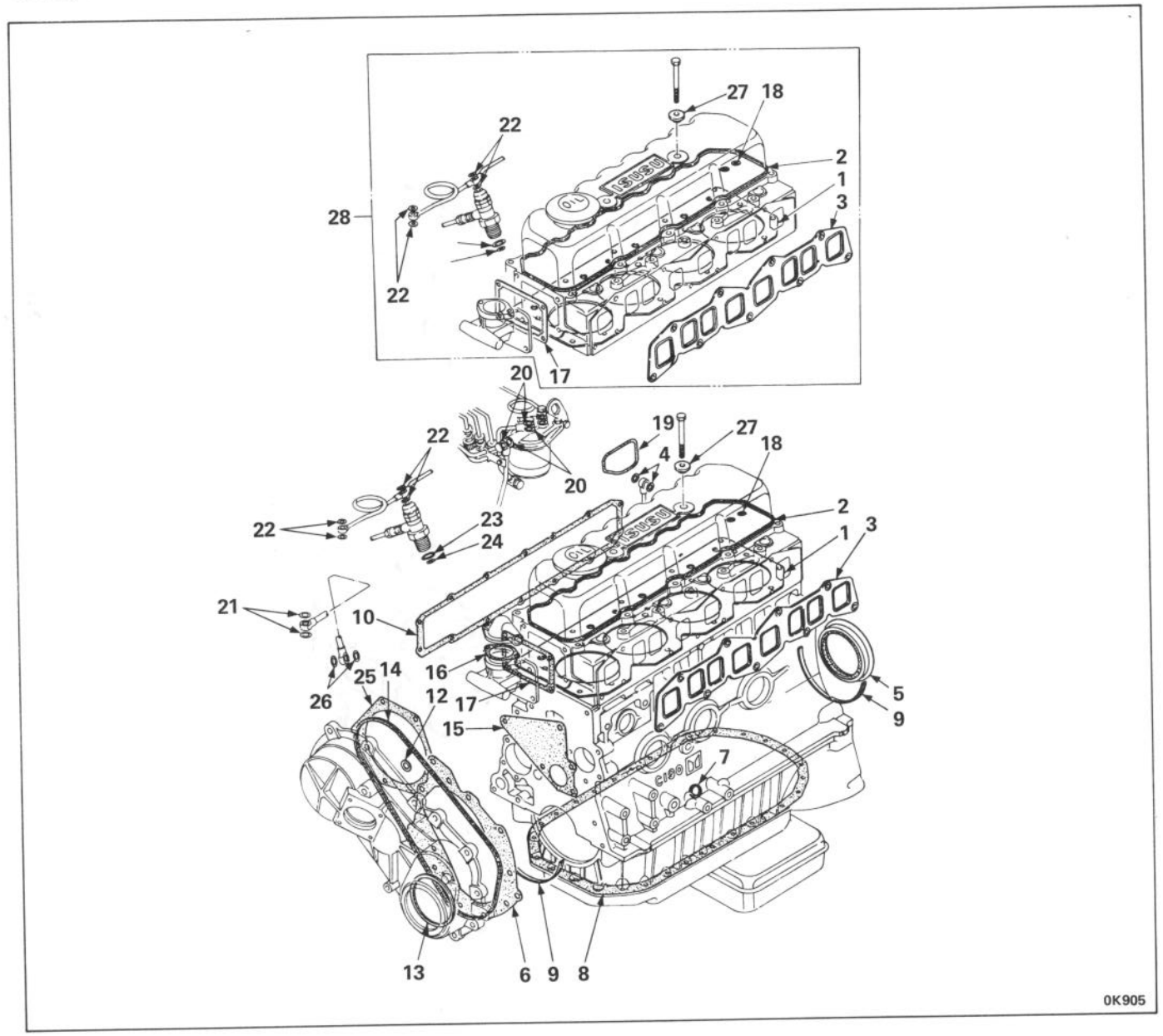
C190GB, C190KE models



1. Gasket : cylinder head
2. Gasket : cylinder head cover
3. Gasket : intake and exhaust manifold
4. Gasket : joint bolt
5. Seal : crankshaft rear
6. Gasket : drain plug
7. Gasket : oil pan to case
8. Gasket : oil pan to bearing cap
9. Gasket : tappet cover
10. Gasket : water pump to cylinder block
11. Gasket : outlet pipe
12. Gasket : cylinder head to housing
13. Sealing ring
14. Gasket : oil filter to block
15. Gasket : throttle valve
16. Gasket : nozzle holder
17. Washer : corrugated, holder
18. Gasket : vacuum pipe
19. Oil seal: crankshaft, front
20. Gasket : body to housing
21. Gasket : pulley to pump
22. Gasket : head cover
23. Repair kit : top over haul

ENGINE REPAIR KIT

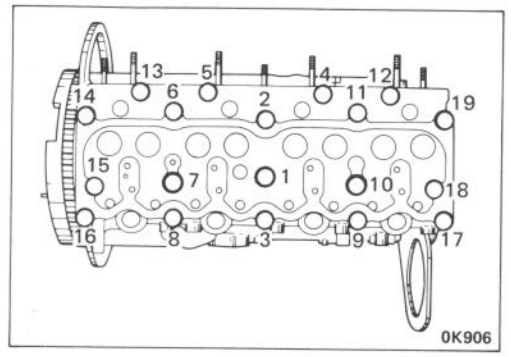
C190; C240 models



1. Gasket : cylinder head
2. Gasket : cylinder head cover
3. Gasket : intake and exhaust manifold
4. Gasket : joint bolt
5. Seal : crank shaft rear
6. Gasket : front plate
7. Gasket : drain plug
8. Gasket : oil pan to case
9. Gasket : oil pan to bearing cap
10. Gasket : tappet cover
12. Gasket : gear case
13. Seal : oil
14. Gasket : gear case
15. Gasket : water pump to cylinder block
16. Gasket : outlet pipe
17. Gasket : cylinder head to housing
18. Ring : sealing
19. Gasket : oil filter to clock
20. Gasket : fuel pump
21. Gasket : vacuum pipe
22. Gasket: throttle valve
23. Washer : nozzle holder
24. Washer : corrugated, holder
25. Gasket : bracket to front plate
26. Gasket : vacuum pipe
27. Gasket : head cover bolt
28. Repair kit : top overhaul kit

SERVICING

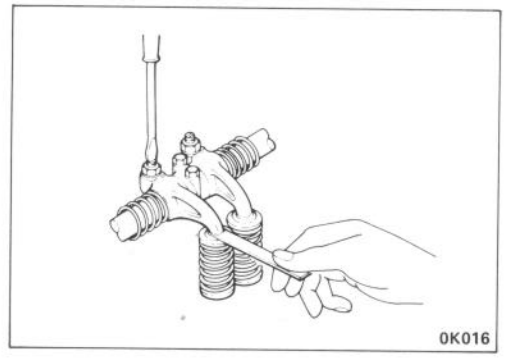
CYLINDER HEAD



Tighten the cylinder head bolts in sequence as shown in the figure.

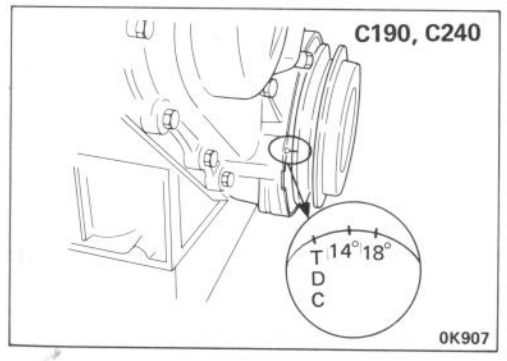
Torque	(kg-m)	8.0

VALVE CLEARANCE

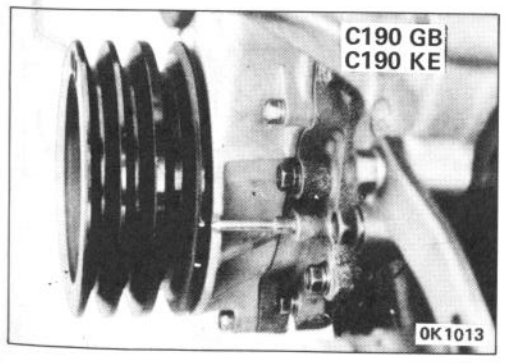


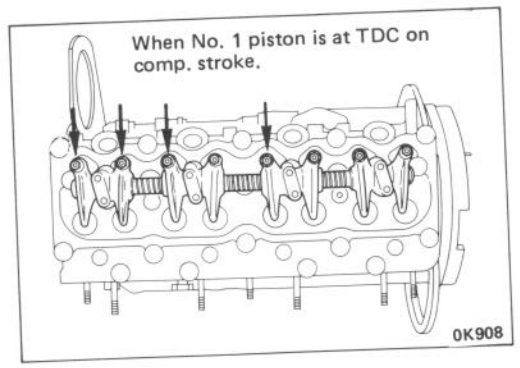
Adjust the valve clearances in the following manner using a feeler gauge.

	(mm)
Intake and Exhaust (in cold)	0.45

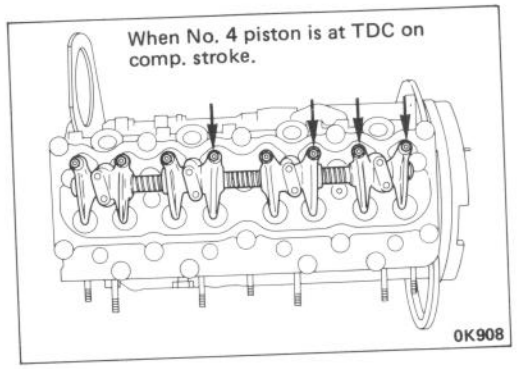


Turn the crankshaft until the TDC notched line on crankshaft pulley is aligned with the pointer to bring the piston in either No. 1 or No. 4 cylinder into top dead center on compression stroke. Hand-feel looseness of intake and exhaust valve push rods on the No. 1 cylinder. When both the push rods have a play, it indicates that the No. 1 piston is at top dead center on compression stroke. When the valves on No. 1 cylinder are pushed open, it indicates that the No. 4 piston is at top dead center on compression stroke.



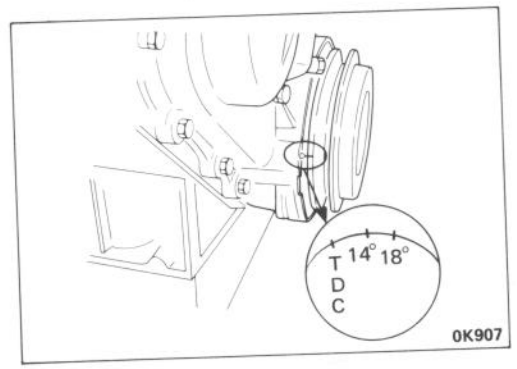


Adjust the clearances of the valves marked with an arrow.



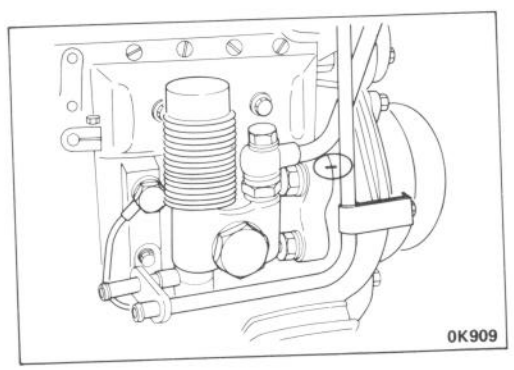
After adjusting the valve clearances referring to the drawing, turn the crankshaft one full turn in the rotative direction and align the TDC mark with the pointer, then adjust the remaining valve clearances.

INJECTION TIMING



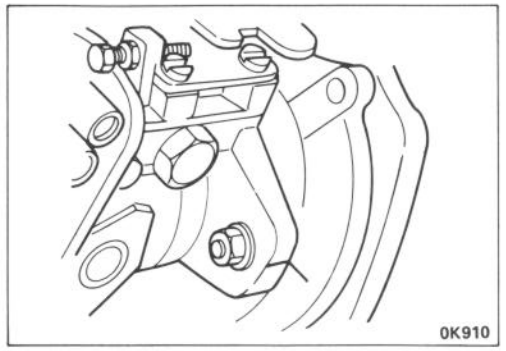
(C190, C240)

Timing	C190	18°
	C240	14°



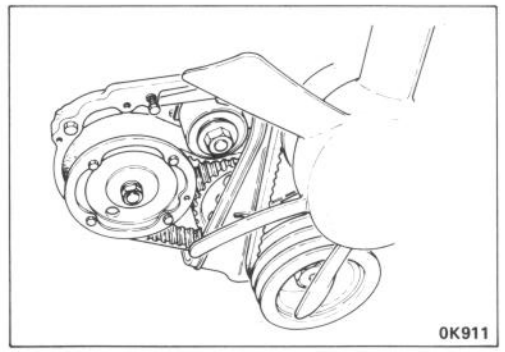
Check that notched line on the injection pump is in alignment with notched line on the injection pump bracket.

AIR CLEANER



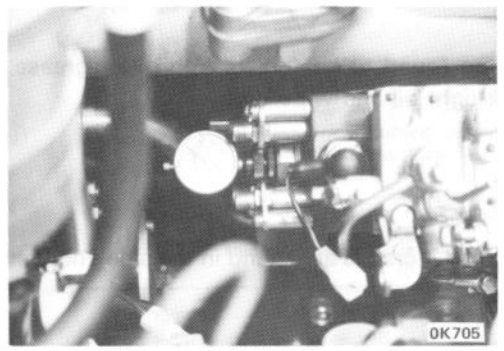
(C190GB, C190KE)

Check that notched line on the injection pump flange is in alignment with notched line on the front plate.



Adjustment

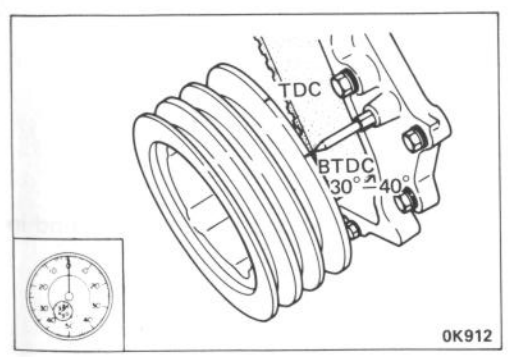
Bring the piston in No. 1 cylinder to top dead center on compression stroke by turning the crankshaft as necessary. With the front upper cover removed, check that timing belt is properly tensioned and that timing marks are aligned.



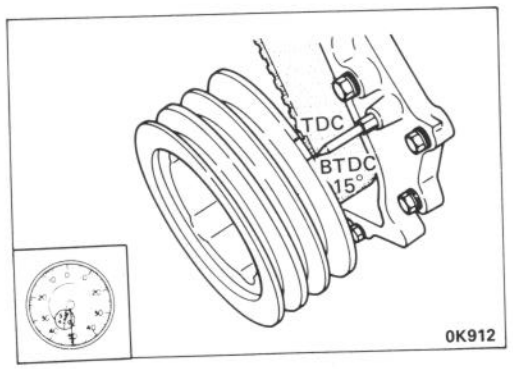
Disconnect the injection pipe from the injection pump and remove the distributor head screw, then install measuring device.

The dial indicator should be installed with the probe depressed inward by approximately 2 mm.

Measuring device



Bring the piston in No. 1 cylinder to a point 30 — 40 degrees before top dead center by turning the crankshaft, then calibrate the dial indicator to zero.



Turn the crankshaft until the line 15° on damper pulley is brought into alignment with the pointer, then take reading of the dial indicator.

(mm)

Standard reading	0.47 — 0.53
Timing	15°

Turn the crankshaft in normal direction of rotation.

If the injection timing deviates from the specified range, loosen pump fixing nuts and bracket bolts, then make an adjustment by varying injection pump setting angle.

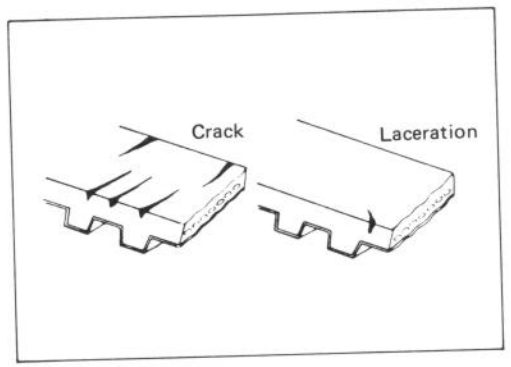
- When larger than standard value;
  Turn the injection pump toward the engine so that the dial gauge indication falls within the standard value.
- When smaller than standard value;
  Turn the injection pump away from the engine so that the dial gauge indication falls within the standard value.

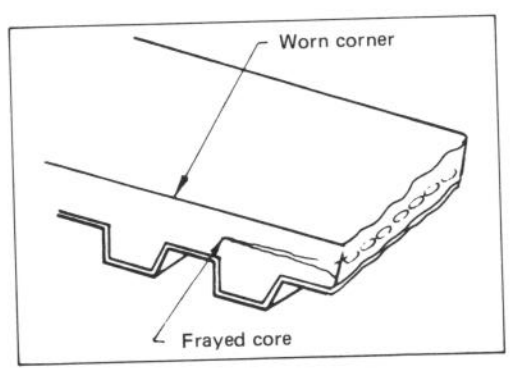
TIMING PULLEY (C190GB)

Timing pulley

If the timing pulleys are found to be fouled with oil or grease, clean with gasoline or light oil and wipe dry quickly.

Timing belt

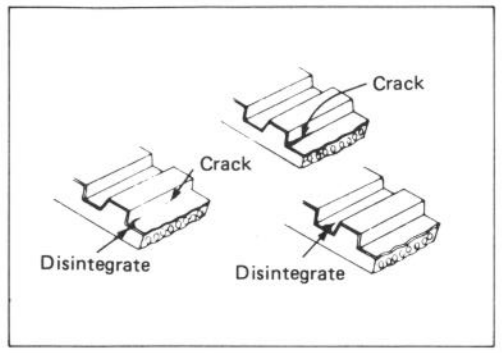




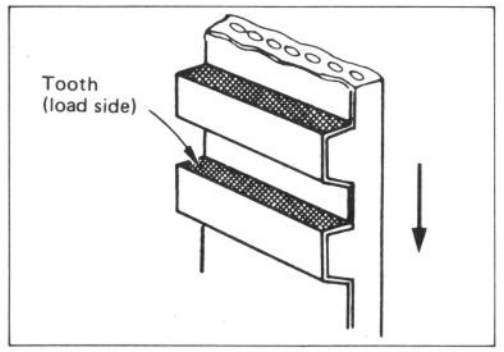
Visual check

The belt must be replaced if cracks are found in the side and rear faces.

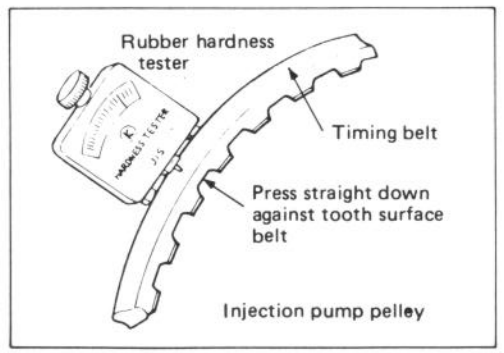
Also replacement is necessary when abnormal wear is found in the side face.



Replacement is necessary when fabric is found to be cracked or disintegrated.



Replacement is also necessary when cogs are found to have abnormal wear.



Take measurements at 3 — 5 points around the circumference of the belt. The belt must be replaced evne if a single measurement if beyond the limit.

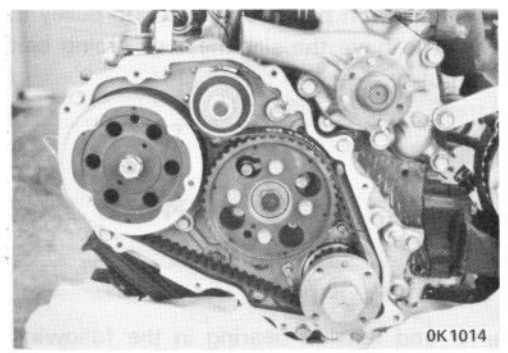
Limit of rubber hardness (HS)	90

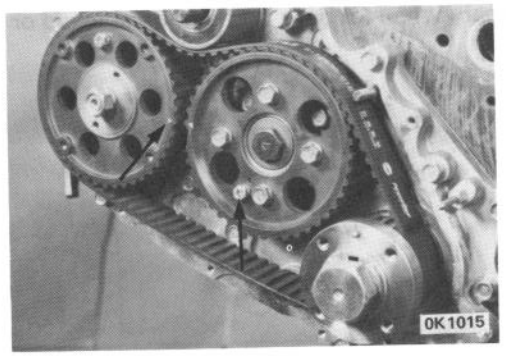
Rubber hardness tester

Timing belt replacement (C190GB, C190KE)

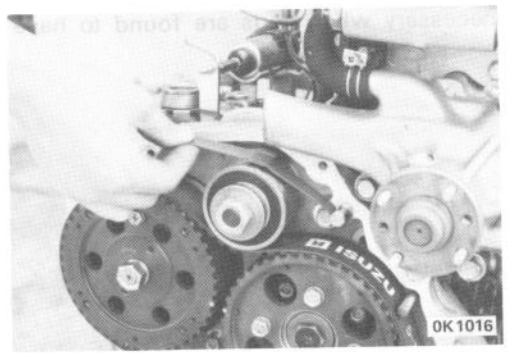
Removal

Remove the crankshaft pulley and pulley housing covers A and B, then remove the injection pump timing pulley flange.

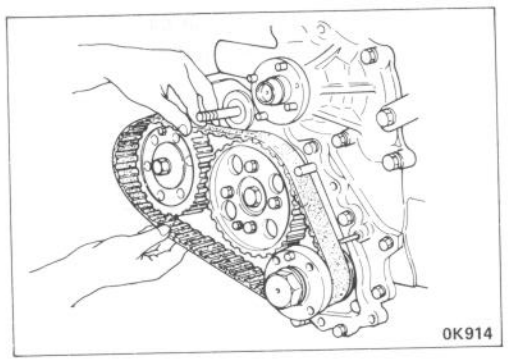




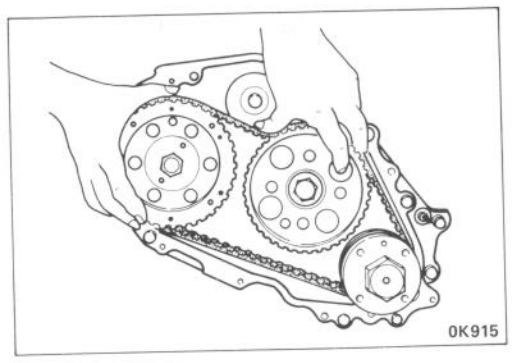
Install the crankshaft pulley and bring the piston in No. 1 cylinder to top dead center on compression stroke. Check to make certain the mark "▲" on the injection pump timing pulley is in alignment with the mark "▲" on the camshaft pulley. Secure the injection pump pulley and camshaft pulley with the bolts.



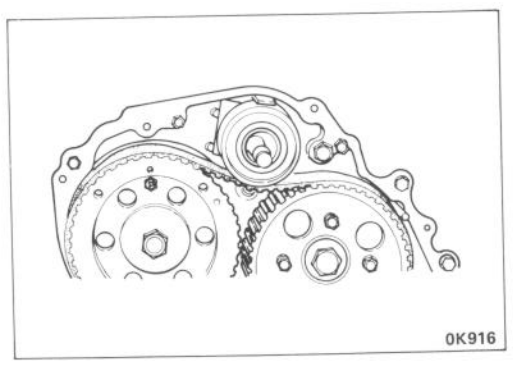
Remove the crankshaft pulley, then remove the tension spring, tension bearing and tension center.



Replace the timing belt.

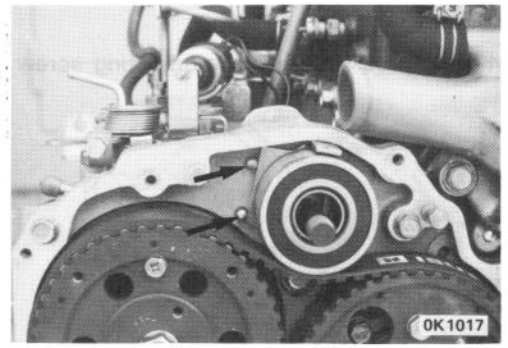


Check to make sure the mark on the timing pulley and on the crankshaft pulley are in alignment with the pointer. Set the belt on the crankshaft pulley, camshaft pulley and injection pulley in that sequence, then adjust to have the slackness of timing belt taken up by the tension pulley.



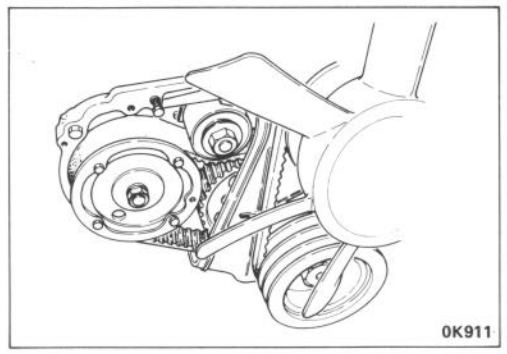
Install the tension center and tension bearing in the following manner: Install the tension center, so that its end is in proper contact with the pins on the front pulley. Install and hand-tighten the tension bearing nut. Install the tension spring and remove the pulley fixing bolts, then semi-tighten the tension bearing nut.

Nut semi-tightening torque (kg-m)	3 — 5



Turn the crankshaft 2 turns in normal direction of rotation. Further turn the crankshaft 90 degrees beyond the top dead center. Loosen the tesion beaing nut to take up slackness of the belt, then tighten the nut to specification.

Torque (kg-m)	11 — 13

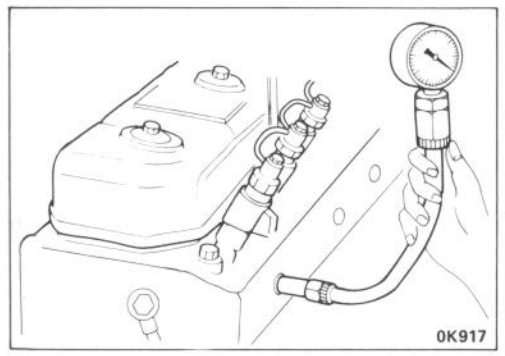


Install the flange by aligning hole in the outer circumference of the flange with the mark "▲" on the injection pump. Turn the crankshaft 2 turns and check that timing marks "▲" on the pulleys are in alignment.

Injection timing

Refer to Section 1 general information on page 1-15 for Injection timing adjustment.

COMPRESSION PRESSURE



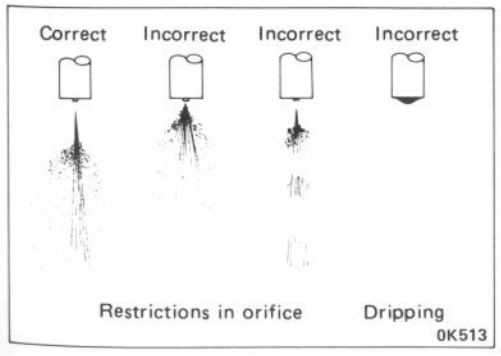
Remove the glow plugs from all cylinders, then check the compression pressure in each cylinder with a compression gauge by engaging starter.

(kg/cm² at 200 rpm)

Standard	Limit
31.0	22.0 — 23.0

Adaptor : 5-83571-002-0

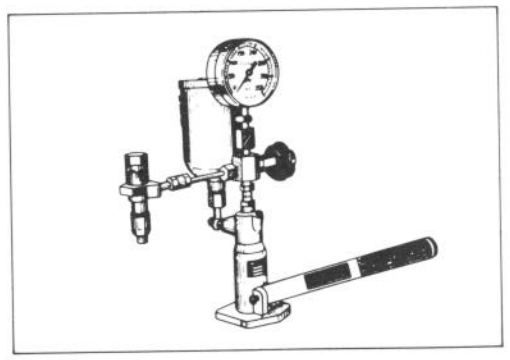
FUEL SYSTEM



Injection nozzle

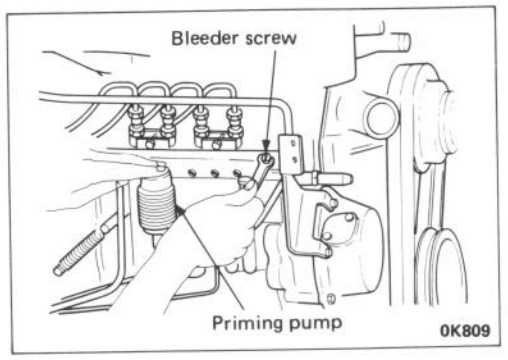
Check the spraying condition and injection starting pressure.

Injection pressure (kg/cm²)	C190GB, C190KE	105
	C190, C240	120



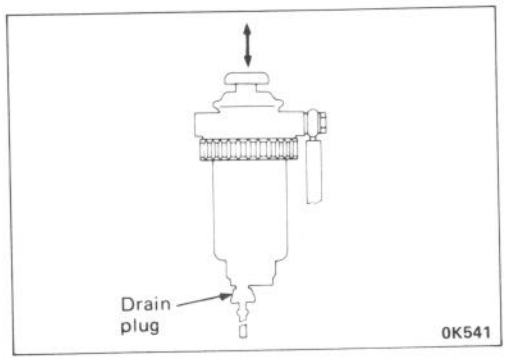
Adjustment

Adjust the injection starting pressure with the adjusting screw using a nozzle tester.



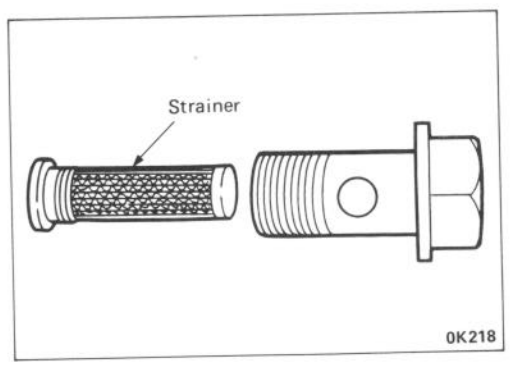
Bleeding (C190, C240)

Bleed the system by manually operating the priming pump with the fuel filter outlet joint bolt and injection pump bleeder screw loosened.



(C190GB, C190KE)

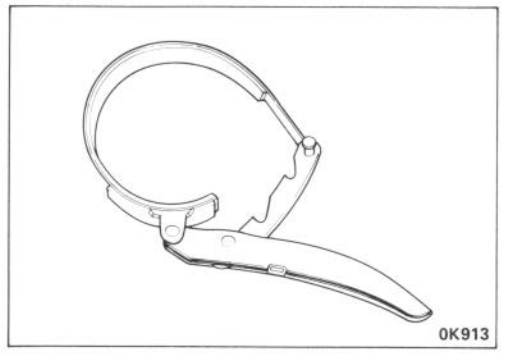
Fill the injection pump chamber with diesel fuel through the overflow valve hole.
Move the hand pump located on the fuel filter up and down.



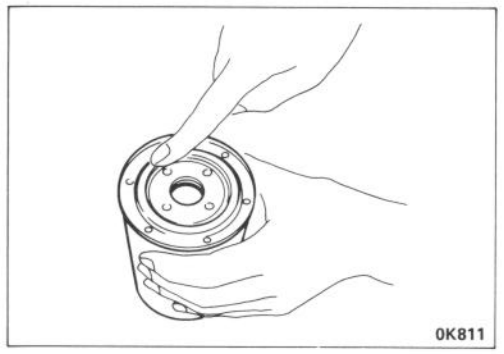
Feed pump strainer (C190, C240)

Remove the strainer using a screw driver. Wash the strainer in clean diesel fuel.

Fuel filter replacement

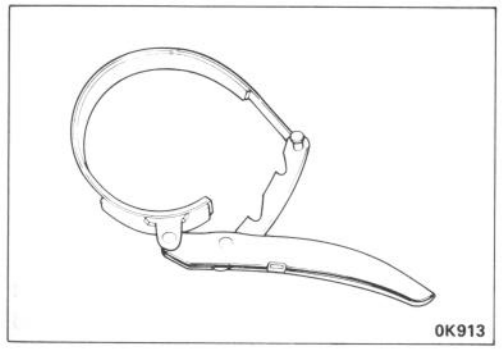


Remover and installer



Apply diesel fuel to O-ring. Turn in filer until sealing face is brought into contact with the O-ring. Further tighten 2/3 of a turn.

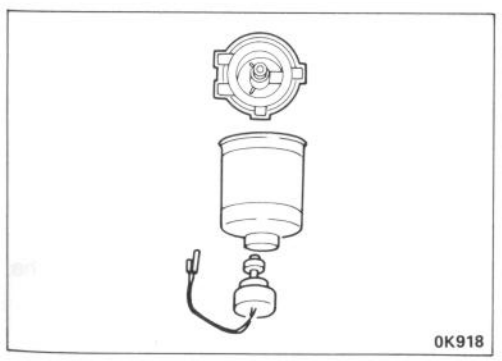
Fuel sedimentor (if equipped)



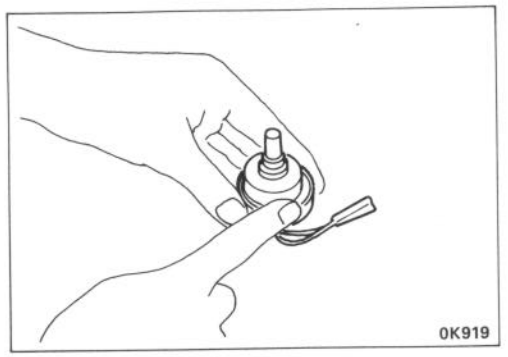
Removal steps:

1. Disconnect water separator sensor wiring at the connector.
2. Remove the filter using filter wrench.

Filter wrench



3. Remove the sensor from filter.



Installation steps

1. Install the sensor on a new filter.
   Apply diesel fuel to the O-ring before installation.

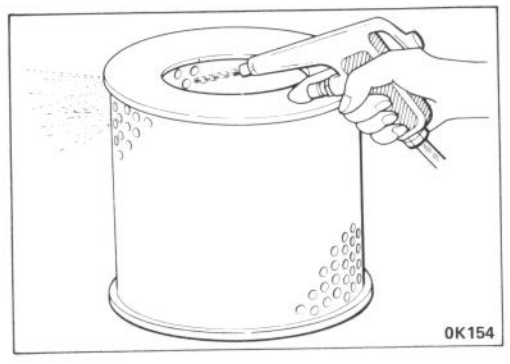
2. Fill the filter sufficiently with diesel fuel before installing it in the housing.
   Apply diesel fuel to O-ring. Turn in filter until sealing face is brought into contact with the O-ring. Further tighten 2/3 of a turn.

AIR CLEANER

Viscus type air cleaner. (PAD, KBD)

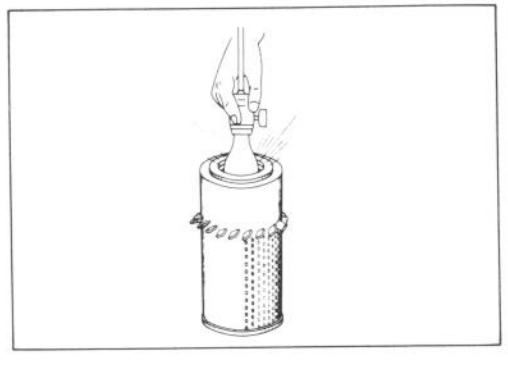
The viscus type air clearer element should not be cleaned for reuse and should be replaced with a new one.

Dry type air cleaner. (KAD, TLD)



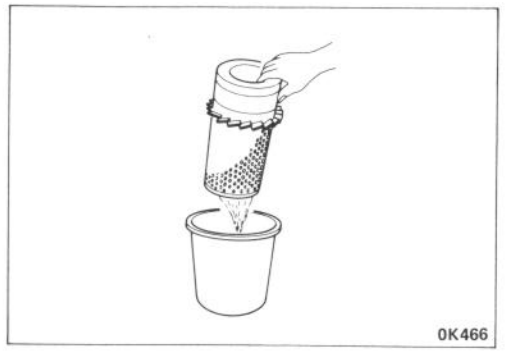
Cleaning of element

When the element is fouled with dust
Apply compressed air to the element from inside while turning it with hand. The pressure of compressed air should not exceed 7 kg/cm^2.



Inspection of element

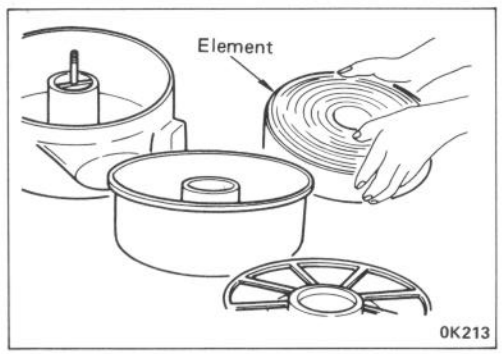
After allowing the element to dry completely, check for the damage using a light bulb within the element.



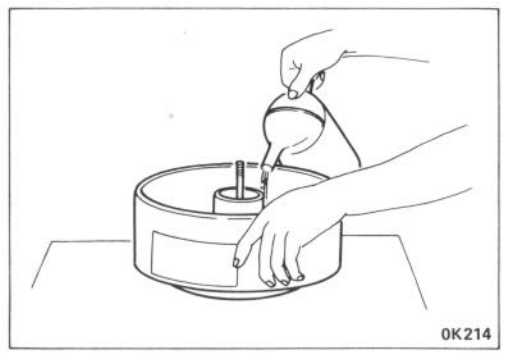
When the element is fouled sooty:

Prepare cleaning solution by diluting essential element cleaner (Donaldson D1400) with water and keep the element submerged in solution for about 20 minutes.
Take out the element and rinse well with running water.
Allow the element to dry in a well ventilated place or using an electric fan. Avoid use of compressed air or open flames for quick drying. It is recommended that a spare element be used as it normally takes 2 — 3 days for natural drying.

Oil bath type air cleaner (Option)



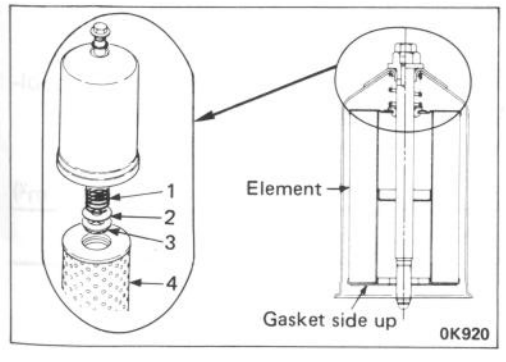
Wash clean the element in detergent oil, Wash the case to remove dust and other foreign matter.



Install the element and case after cleaning. Fill the oil pan to the specified level using engine oil.

Oil capacity	(liter)	0.7

LUBRICATING SYSTEM

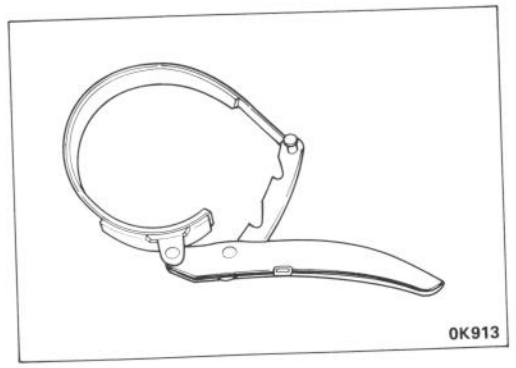


Main oil filter

C240 only

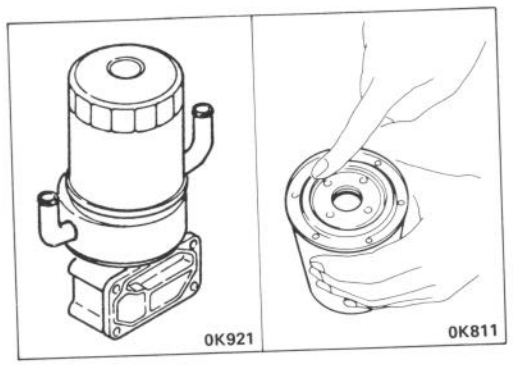
Install the element assembly in sequence of spring (1) spring seat (2) and rubber gasket (3).

With oil cooler type



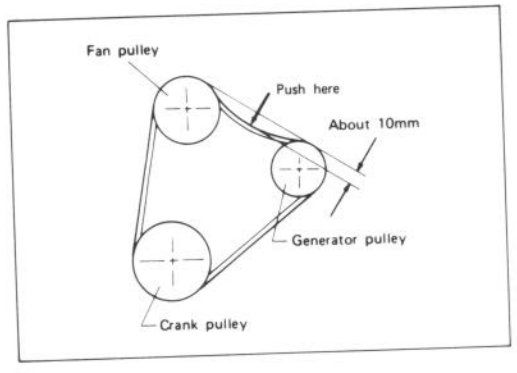
Remover and installer

Filter wrench



Apply engine oil to O-ring. Turn in filer until sealing face is brought into contact with the O-ring. Further tighten 2/3 of a turn.

FAN BELT

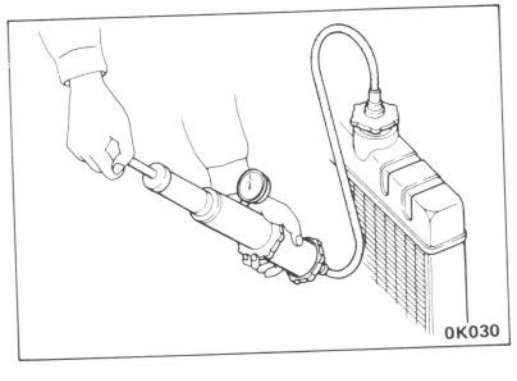


Adjustment

Adjust belt tension by moving generator pulley.

Specified belt deflection	(mm)	10

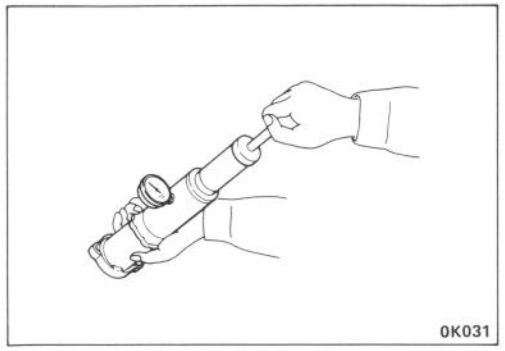
RADIATOR



Install radiator filler cap tester on the radiator and check the cooling system for leakage by applying tersting pressure.
Testing pressure should not exceed the specified pressure.

(kg/cm²)

Testing pressure	2.0

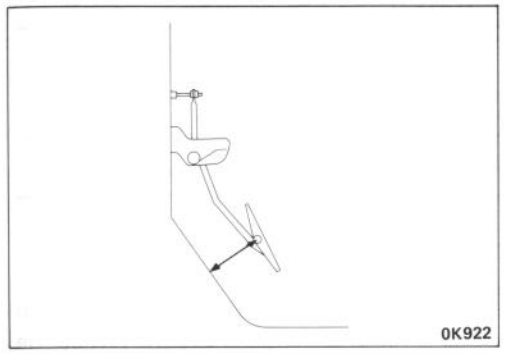


Radiator filler cap

(kg/cm²)

Pressure valve	Negative Pressure valve
0.9 — 1.2	0.04 — 0.05

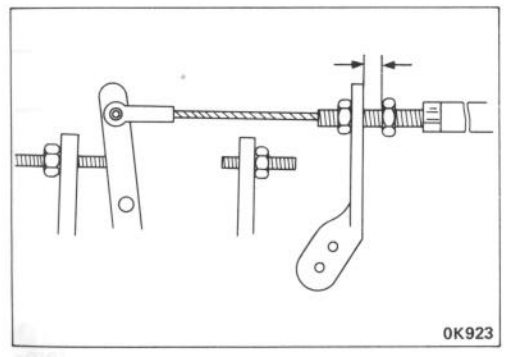
ENGINE CONTROL



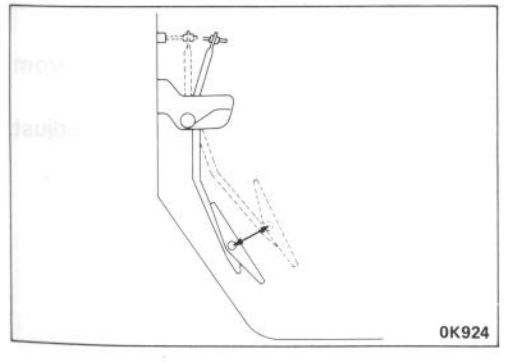
PAD model

Inspection of accelerator pedal height from floor.

Height	(mm)	114

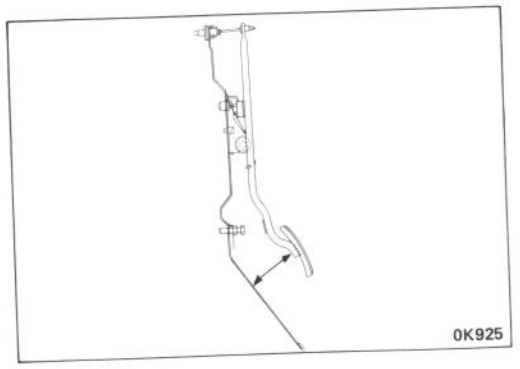


Tighten the nut B until play in the inner cable is completed removed. Adjust the clearance between the bracket and nut to 2 — 3 mm. Tighten the nut B until nut A makes contact with the bracket, then lock the nut B.



When adjustment at pump side is completed, check that accelerator pedal stroke is within the specified value.

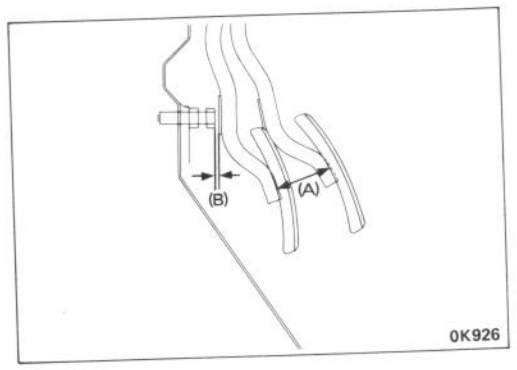
Stroke	(mm)	65



KBD model

Inspection of accelerator pedal height from floor.

Height	(mm)	94

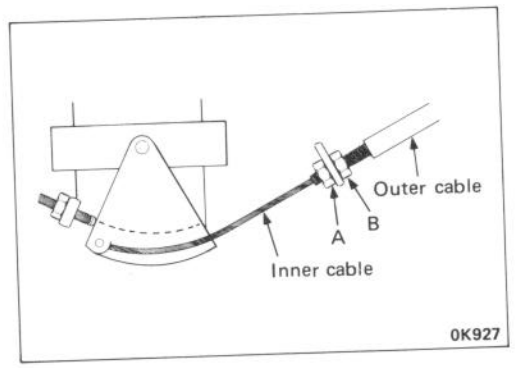


Adjustment of pedal stroke

Stroke (A)	(mm)	40

Clearance between pedal and pedal stopper bolt

Clearance (B)	(mm)	0 — 3



With the throttle valve closed completely, set the outer cable, so that play in the inner cable is removed. Back off the nut A one or two turns and lock the nut in that position with the nut B.

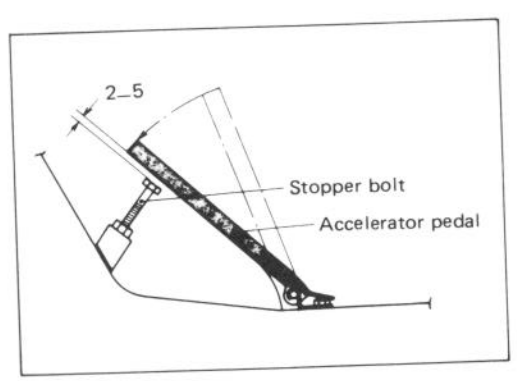
Play of inner cable	(mm)	2 — 3

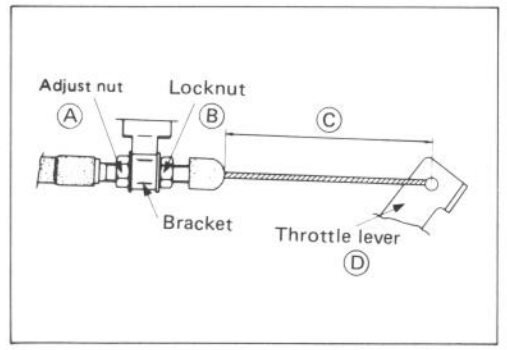
Adjustment of idling

1. Start and let the engine idling until cooling water temperature reaches 70 — 80°C.
2. Returned the idling control knob to idling position.
3. Check that engine idling speed is within the range of from 600 — 650 rpm (PAD) or 675 — 725 rpm (KBD).
   If the idling speed deviates from the specified range, adjust with the throttle valve adjust bolt.

KAD, TLD models

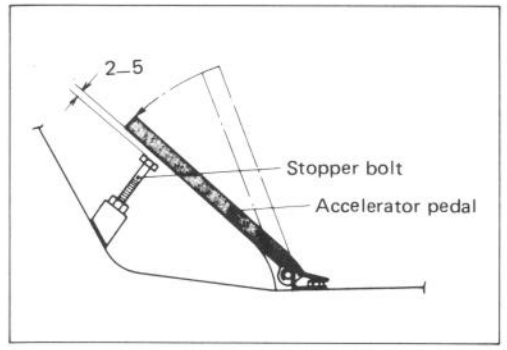
The accelerater is controlled by means of the cable.





Adjustment

1. Check that idling control knob is returned to home position.
2. Hold the throttle lever Ⓓ in fully closed position and remove slackness of cable Ⓒ with adjust nut Ⓐ.
3. Lock the lock nut Ⓑ.

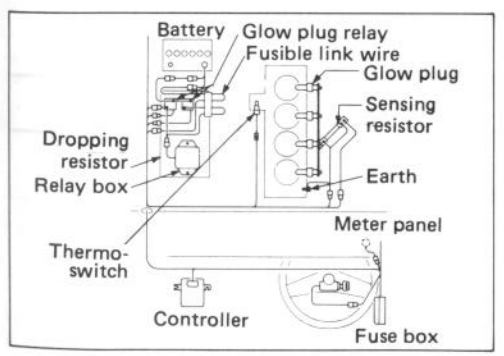


Adjust setting of the stopper bolt, so that the clearance between the end of the stopper bolt and lower face of the accelerater pedal is adjusted to the range (2 — 5 mm) when the throttle valve is fully closed completely.

Adjustment of idling

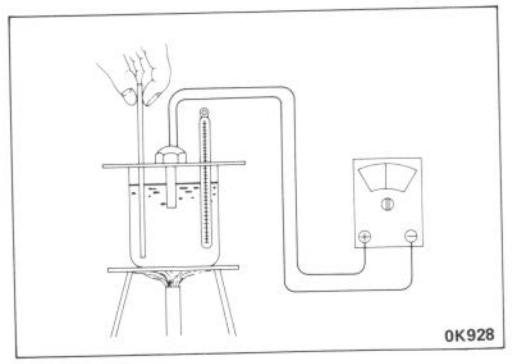
1. Start and let the engine idling until cooling water temperature reaches 70 — 80°C.
2. Returned the idling control knob to idling position.
3. Check that engine idling speed is within the range of from 675 — 725 rpm.
   If the idling speed deviates from the specified range, adjust with the throttle valve adjust bolt.

QUICK ON SYSTEM



Quick on system circuit diagram

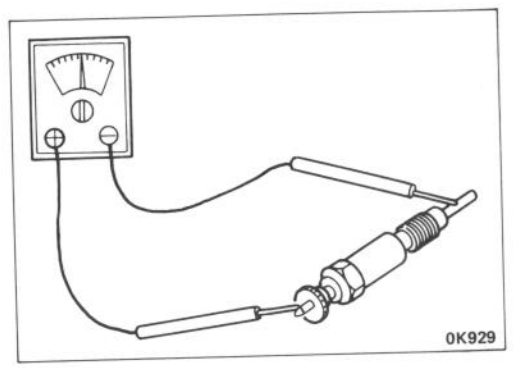
A quick on start device is newly employed to minimize the time for preheating and to ensure easy stating.



Thermo switch

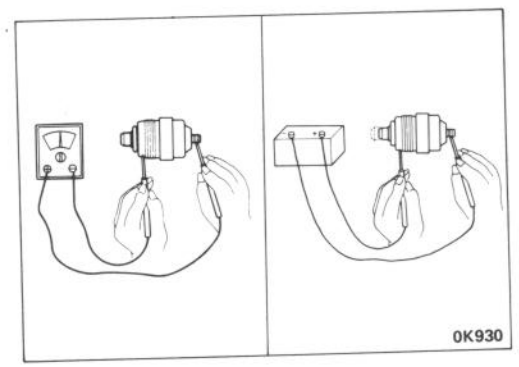
Operating temperature

Switch OFF	47 — 53°C or higher
Switch ON	43 — 50°C or lower



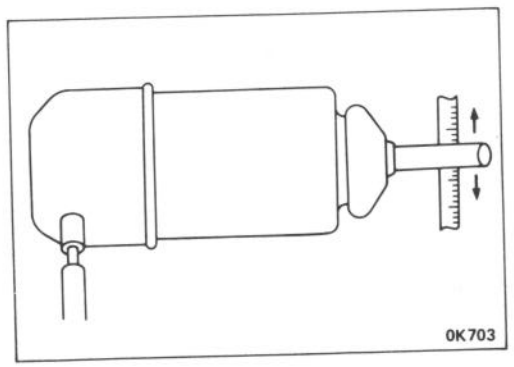
Glow plugs

Check for continutity across the plug terminals and body.



Fuel cut solenoid (VE pump only)

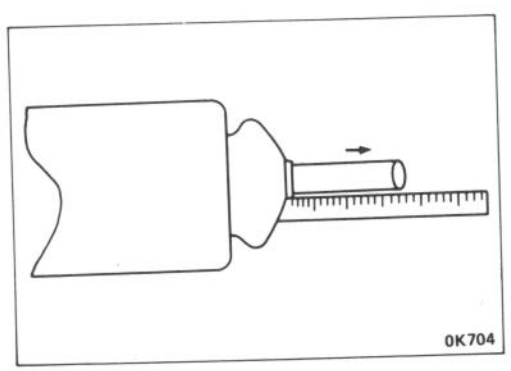
Check for continuity across the plug terminals and solenoid. Operation of solenoid can also be tested using a battery.



Fast idle control device (VE pump only)

Check the shaft for run-out at end of shaft against center of solenoid.

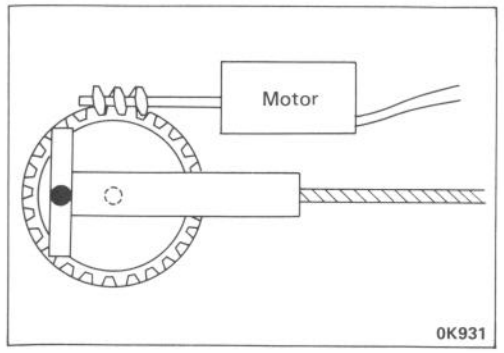
Standard	(mm)	2.5 or less



Measure the plunger stroke as it jumps out.

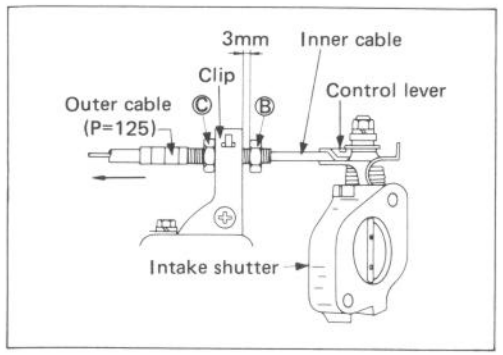
Standard	(mm)	4.5 — 6.0

ELECTRICAL INTAKE SHUTTER (C190, C240



Motor

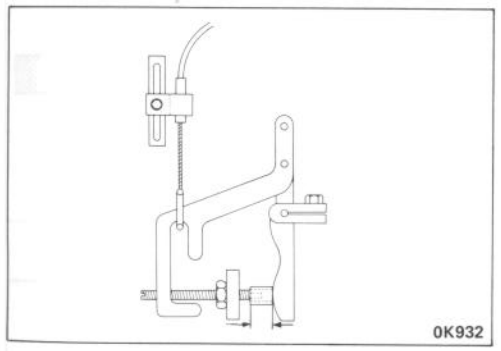
Check to make certain the intake shutter operates properly when the starter switch is turned on.



Adjustment of cable

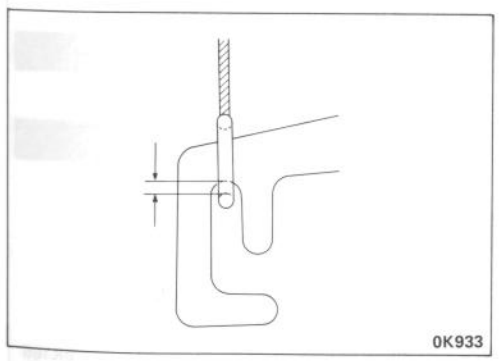
1. With the starter switch off loosen the nuts Ⓐ and Ⓑ . Pull the outer cable in direction of arrow until play in the inner cable is removed completely, then tighten the nut Ⓐ temporarily.
2. Adjust the clearance between the bracket and nut Ⓑ to 3 mm then turn in the nut Ⓐ.
3. Check to make certain the engine stalls when the starter switch is turned off.

FUEL ENRICHMENT DEVICE (OPTION)



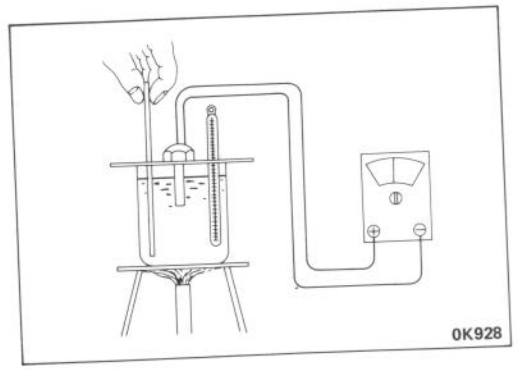
Adjustment of cable

1. Connect the joint at end of cable to the control lever.
2. Install the stopper clip in position between smoke set screw and control lever.
3. Pull the outer cable until play in the inner cable is completely removed.
4. Tighten the clamp bolt when play in the inner cable is



5. Remove the stopper clip.
6. Clearance between control lever and joint.

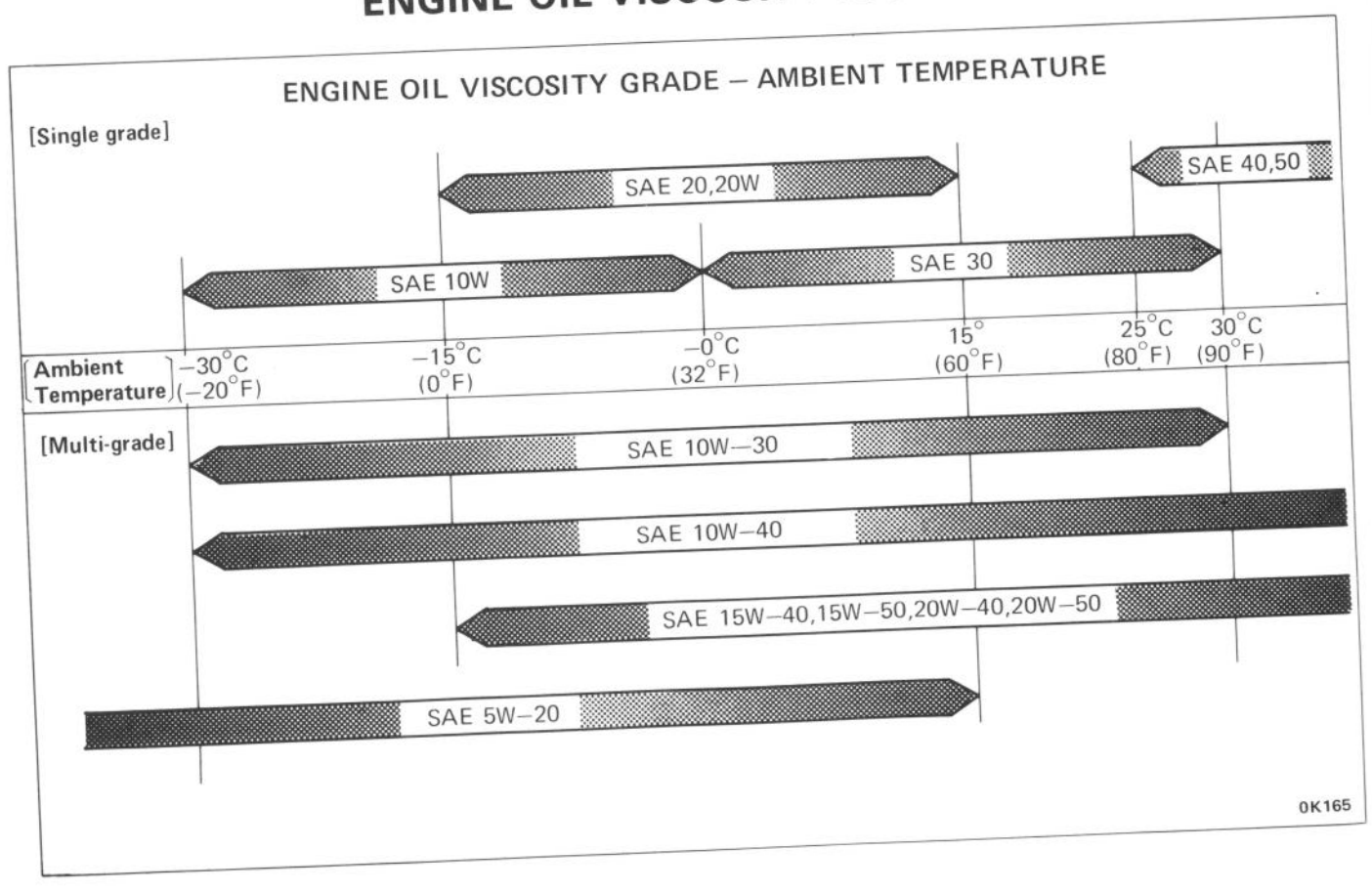
Standard	(mm)	0.5 — 1.5



Thermo switch

The thermo switch is preset to turn on at the coolant temperature of 10°C or below and to turn off when the coolant temperature increases beyond 10°C.

ENGINE OIL VISCOSITY CHART



RECOMMENDED LUBRICANTS

*Mark ... Isuzu genuine lubricants

LUBRICATION	TYPE OF LUBRICANT	MAKE AND BRAND
Engine	Diesel engine oil CC or CD grade	**CC grade** *BESCO SUPER ENGINE OIL BP ENERGOL HD OIL BP VANELLUS M BP SUPER VISCO STATIC BP VISCO 2000 BP VANELLUS M MULTIGRADE CHEVRON DELO 200 MOTOR OIL CHEVRON DELO 100 MOTOR OIL CASTROL or DEUSOL CRB CALTEX FIVE STAR MOTOR OIL CALTEX RPM DELO 200 OIL CALTEX RPM DELO 100 OIL ESSOLUBE HDX ENI AGIP F.1 DIESEL GAMMA ENI AGIP F.1 SUPER MOTORIL ENI AGIP F.1 MOTOR OIL HD MOBIL DELVAC 1100 SERIES MOBIL HEAVY DUTY MOBIL SPECIAL MOBIL DELVAC SPECIAL MOBIL 1 SHELL ROTELLA SX OIL SHELL ROTELLA TX OIL SUNOCO SUNLUBE MOTOR OIL SUNOCO DYNALUBE MOTOR OIL SUNFLEET MIL-B TEXACO HAVOLINE MOTOR OIL TEXACO URSA OIL EXTRA DUTY TEXACO URSATEX TOTAL GTS TOTAL RUBIA H UNION HEAVY DUTY MOTOR OIL **CD grade** *BESCO S-3 ENGINE OIL BP VANELLUS C3 BP VANELLUS C3 MULTIGRADE CHEVRON DELO 400 MOTOR OIL CHEVRON DELO 300 MOTOR OIL CASTROL or DEUSOL CRD CASTROL or DEUSOL CRF CASTROL or DEUSOL RX SUPER CALTEX RPM DELO 400 OIL CALTEX RPM DELO 300 OIL ESSOLUBE D-3 ENI AGIP F.1 DIESEL SIGMA MOBIL DELVAC 1200 SERIES MOBIL DELVAC 1300 SERIES MOBIL DELVAC SUPER MOBIL DELVAC SHC SHELL RIMULA CT OIL SHELL RIMULA X OIL SHELL MYRINA OIL SUNFLEET SUPER C SUNFLEET DIESELUBE SUNFLEET DIESELUBE XD TEXACO URSA OIL SUPER TEXACO URSA OIL LA-3 TOTAL RUBIA S TOTAL RUBIA TM UNION GUARDOL MOTOR OIL

*Mark ... Isuzu genuine lubricants

LUBRICATION	TYPE OF LUBRICANT	MAKE AND BRAND
Injection pump governor	Hydromaster and airmaster paste	BP SHOCK ABSORBER OIL CALTEX CAPELLA OIL 22WF CASTROL ICEMATIC 44 CHEVRON REFRIGERATION OIL 32 ENI AGIP F.1 TER 34 ENI AGIP F.1 SHOCK ABSORBER ESSO ZERICE 15 MOBIL GARGOYLE ARCTIC OIL LIGHT SHELL CLAVUS OIL 17 SUN SUMISO GS OIL SUNFILL M-3310 TEXACO CAPELLA OIL 22WF TOTAL LUNARIA 46
Engine cooling system	Permanent type anti-freeze solution	*ISUZU ANTI-FREEZE PT BP ANTIFROST CALTEX AF COOLANT CASTROL ANTI-FREEZE CHEVRON ATLAS PERMA-GUARD ANTI-FREEZE AND COOLANT ENI AGIP F.1 ANTI-FREEZE ESSO RAD MOBIL PERMAZONE SHELLZONE SHELL GLYCOSHELL PLUS SHELLSAFE TEXACO ANTI-FREEZE COOLANT TEXACO STARTEX ANTI-FREEZE COOLANT TOTAL ANTIGEL UNION YEAR AROUND ANTI-FREEZE AND COOLANT

SECTION 2

ENGINE ASSEMBLY

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GENERAL DESCRIPTION

C190 C240 models

C190 C240 models